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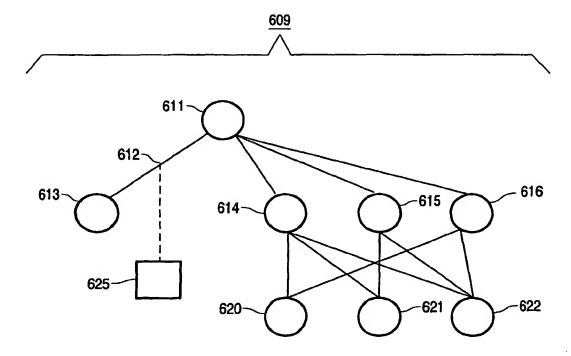
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(54) Title: TOPOLOGICAL IMAGE MODEL



(57) Abstract: Method of transforming a voxel representation of an N-dimensional object into a computer model containing a cellular space, which is a specific form of graph. An indicator attached to each edge of the cellular space indicates whether a border belongs to an object. This is useful for three-dimensional compression of video sequences and for Internet video sequence search.

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#### B. FIELDS SEARCHED

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	ENTS CONSIDERED TO BE RELEVANT		
ategory °	Citation of document, with indication, where appropriate, of the	Relevant to claim No.	
X	EP 1 003 131 A (KOELMAN INTELL EIGENDOM) 24 May 2000 (2000-05 abstract; claims 1-3 column 7, line 23-31 column 8, line 56 -column 9, l	<del>-24</del> )	1-14
X Fu	rther documents are listed in the continuation of box C.	Patent family members	s are listed in annex.
"A" docum cons "E" earlie filing "L" docum whic citati "O" docum othe "P" docum later	nent defining the general state of the art which is not idered to be of particular relevance or document but published on or after the international date on the categories of	cited to understand the pri invention  "X" document of particular releverant to expenditure the cannot be considered now involve an inventive step were cannot be considered to indocument is combined with ments, such combination in the art.  "&" document member of the second to understand the combination in the art.	contict with the application but notiple or theory underlying the vance; the claimed invention ell or cannot be considered to when the document is taken alone vance; the claimed invention involve an inventive step when the hone or more other such documents obvious to a person skilled arme patent family
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	d mailing address of the ISA	Authorized officer	
	European Patent Office, P.B. 5818 Patentlaan 2		

		PC1/1B 03/03034
	ation) DOCUMENTS CONSIDERED TO BE RELEVANT	Relevant to claim No.
Category °	Citation of document, with indication, where appropriate, of the relevant passages	ABBVAIL to Stain 140.
A	AGHBARI Z ET AL: "VST-model: a uniform topological modeling of the visual-spatio-temporal video features" MULTIMEDIA COMPUTING AND SYSTEMS, 1999. IEEE INTERNATIONAL CONFERENCE ON FLORENCE, ITALY 7-11 JUNE 1999, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 7 June 1999 (1999-06-07), pages 163-168, XP010519376 ISBN: 0-7695-0253-9 page 163, right-hand column, last paragraph -page 164, left-hand column, paragraph F	1-14
A	PORIKLI F M ET AL: "An unsupervised multi-resolution object extraction algorithm using video-cube" PROCEEDINGS 2001 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP 2001. THESSALONIKI, GREECE, OCT. 7 - 10, 2001, INTERNATIONAL CONFERENCE ON IMAGE PROCESSING, NEW YORK, NY: IEEE, US, vol. 1 OF 3. CONF. 8, 7 October 2001 (2001-10-07), pages 359-362, XP010563772 ISBN: 0-7803-6725-1 the whole document	3
A	FELS S ET AL: "Techniques for interactive video cubism" PROCEEDINGS ACM MULTIMEDIA 2000, PROCEEDINGS OF MULTIMEDIA 2000, LOS ANGELES, CA, USA, 30 OCT4 NOV. 2000, pages 368-370, XP001173137 2000, New York, NY, USA, ACM, USA ISBN: 1-58113-198-4 the whole document	3

## INTERNATION SEARCH REPORT

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Patent document cited in search report		Publication	Patent family		Publication
		date	member(s)		date
EP 1003131	Α	24-05-2000	NL EP	1010452 C2 1003131 A1	03-05-2000 24-05-2000